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ABSTRACT

Focusing on feedback as a necessary condition for goals to affect performance, it was predicted that feedback and goals would be interactively related to performance. This prediction complements findings by Locke and his colleagues that knowledge alone is not sufficient condition for effective performance. Also, it was suggested that the interaction of feedback, an environmental attribute, and self goals, an individual characteristic, be thought of in terms of an individual-environment interaction model. In that sense, it was hypothesized that feedback would facilitate the display of individual differences in self set goals and hence, the self set goals-performance relationship. Results supported the hypothesis by indicating that the individual differences in self goals were significantly higher in the feedback group than in the no feedback group, and that it was in the feedback condition that the relationship between goals and performance was significantly higher than in the no feedback group. (Author/BW)

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The study focused on feedback as a necessary condition for goals to affect performance. It was predicted that feedback and goals would be interactively related to performance. This prediction compliments findings by Locke and his colleagues that knowledge alone is not a sufficient condition for effective performance. Also, it was suggested that the interaction of feedback, an environmental attribute and self goals, an individual characteristic, be thought of in terms of an individual x environment

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interaction model. In that sense, it was hypothesized that feedback would facilitate the display of individual differences in self-set goals and hence, the self-set goals-performance relationship. Results supported the hypothesis by indicating that the individual differences in self-goals were significantly higher in the feedback group (N = 38), than in the no feedback group (N = 48), and that it was in the feedback condition that the relationship between goals and performance ($\underline{r}$ = .60) was significantly higher than in the no feedback ($\underline{r}$ = -.01).

Feedback: A Necessary Condition For The Goal Setting-Performance Relationship

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Previous research and theorizing by Locke and his colleagues has indicated that knowledge [knowledge of score (KS), knowledge of results (KR), feedback] by itself does not have the power to control action. When differential goal setting by subjects in KR and NoKR conditions was controlled, KR had no effect on performance. Thus, Locke and his colleagues concluded that goals and intentions mediate the effect of feedback on performance (Locke, 1967, 1968; Locke & Bryan, 1967, 1968, 1969; Locke, Cartledge & Koeppel, 1968). The results indicate that KR by itself is not a sufficient condition for performance improvement. They argued that before knowledge can influence behavior, it must be appraised as significant and used to set goals, develop intentions or formulate plans of action (either explicitly or implicitly).

Although the evidence indicates that knowledge is not a sufficient condition for goal setting and task motivation, one could

[1]The author wishes to thank Edwin A. Locke and Ben Schneider for their helpful comments in revising an earlier version of this paper, and Meira Shifrin for her help in preparing the data.

logically ask whether it is a necessary condition. For example, how could a person know he was successfully reaching a goal (or how hard he had to work to reach it) without some form of feedback?

The procedures and experimental design used by Locke et al. are not inconsistent with this question. In their experiments, while the subjects in the KR-No Goal conditions were not, in fact, given the opportunity to set goals, subjects in the NoKR-Goal setting conditions did have some knowledge. For example, in the Locke (1967) study, NoKR-Goal subjects were given knowledge of their progress in relation to their goals. Locke acknowledged that it is not possible to set goals meaningfully unless the subjects have some knowledge of how hard the goals are and how they are performing (or have performed in the past) in relation to their goals.

In another study, by Locke and Bryan (1968), subjects were given a computation task to perform in two groups, KS and NoKS. No goal setting instructions were given. However, after the first part of the experiment, all subjects were asked to set their goals for the second part. Findings indicated that in the second part of the experiment, after subjects set their goals (a) level of performance attained by the KS group was higher than that attained by the NoKS group, (b) the distribution of goals reported by the two groups was different, with KS subjects setting more difficult goals than NoKS subjects. In both groups goals were set on the basis of, not in the absence of, some knowledge of previous performance.

The present study is designed to test the hypothesis that KS

is a necessary condition for goal setting to affect performance. Specifically, it is predicted that goals will be related to task performance only (or more strongly) under conditions of high knowledge and not (or less strongly) under conditions of low knowledge. In other words there will be an interaction between feedback and goals on performance.

It may be argued that this interaction hypothesis is in line with the basic theorem that behavior is a function of the interaction between the individual and the environment, $B = f(P,E)$. A variant of this model is proposed by Schneider (1975) for the prediction of behavior of people at work. His approach is to note that the prediction of performance on the basis of individual characteristics is maximized in certain kinds of situations. He was able to cite few studies that investigated this idea of an interaction between individual differences and organizational attributes (Forehand, 1968; Dunnette, 1973; Schneider, 1974).

The characteristic common to the studies he cited seems to be that it is only under conditions rewarding and supporting individual differences that performance is significantly related to personal attributes. Thus, Schneider raised the hypothesis that performance would be highly predicted by personal characteristics under conditions which facilitated the display of individual differences. The organization conditions which satisfy this criterion were shown to be: differential reward systems, equitable reward systems, encouraging innovation, supportive leadership, and autonomy in work

(Schneider, 1975).

The hypothesis raised by Schneider can be tested in the context of the present study, since external KS and self-set goals can be conceptualized as an environmental attribute and an individual variable, respectively. When there are no constraints on goal setting, and subjects are given KS on an individual basis, KS should increase and support the expression of individual differences.

On the basis of the above discussion the following hypotheses were formulated: (a) There will be higher variance in self-set goals or intentions under KS than NoKS, if goal-setting is not constrained, (b) The relationship between performance and self-set goals will be higher under the KS than under the NoKS condition, and (c) there will be an interaction effect between KS and goal setting in predicting performance such that the interaction effect will be the best predictor.

Method

Subjects

The subjects were 86 undergraduate students enrolled in an introductory psychology course at the Technion-Israel Institute of Technology.

Task

The task was number comparison, requiring quick checking to detect discrepancies between two lists of numbers. It is one of

the common clerical aptitude tests. Two similar forms were used, each in a different stage of the experiment. Performance was measured by the number of correct answers.

Procedure and Conditions

Subjects were divided at random into two groups: the experimental group (the KS group, N = 38), and the control group, NoKS (N = 48). The experiment was administered in two stages. In the first stage the two groups were instructed to perform the task within a specified amount of time. In the second stage, the experimental condition was introduced. At the conclusion of Stage One subjects in the experimental group were told how they had actually performed relative to others during the first stage. This information was given to each experimental group subjects in one of 5 ways:

subjects performance is among the highest 10%

subjects performance is among the highest 25%

subjects performance is among the highest 50%

subjects performance is among the highest 75%

subjects performance is among the highest 90%

The control group received no feedback on performance.

A questionnaire designed to assess subjects' intentions or self-set goal for the second part of the experiment was administered at the beginning of Stage Two to both experimental and control subjects. For the experimental group the questionnaire was administered immediately after the experimental condition, feedback on perform-

ance, was introduced. Subjects were asked to indicate their level of intention for performance on a five-point scale, similar to the five levels of performance feedback:

intention to be among the highest 10%

intention to be among the highest 25%

intention to be among the highest 50%

intention to be among the highest 75%

intention to be among the highest 90%

After this, subjects worked on the second form of the number-comparison task.

Results

The two groups did not significantly differ in performance at the end of Stage One, i.e., before the experimental condition was introduced ($\bar{X}_{KS} = 9.82$, $\bar{X}_{NoKS} = 10.00$, $t = .148$, $p > .05$). Because there were no differences in performance between the two groups at that point, all differences in the second stage can be accounted for by the experimental treatment.

1. The first hypothesis stated that individual differences in levels of intention increase under the KS condition as compared to NoKS. This hypothesis was supported by significant differences between the variances of the two groups in level of intention ($\sigma^2_{KS} = .91$, $\sigma^2_{NoKS} = .41$, $F = 2.29$ (37,47), $p < .01$).

2. The second hypothesis claimed a stronger relationship

between intention or self-set goals and performance for the KS group as compared to the NoKS group.

The Pearson correlation between self-set goals and performance for the KS group was $\underline{r} = .60$ ($p<.01$); for the NoKS group $\underline{r} = -.01$. Using Fisher's $\underline{z}$, the difference between these two correlations was significant ($p<.001$). (The Pearson correlation across all subjects between intention and performance was $\underline{r} = .24$, $p<.05$, and between feedback and performance was $\underline{r} = .25$, $p<.05$.) This result strongly supports the hypothesis that performance is more strongly related to goals under the KS condition than under the NoKS condition. It indicates that the effect of self-goals on performance is moderated by feedback. In other words, feedback and goals are interactively related to performance.

3. The predictive power of the interaction effect of feedback x goal on performance was the third hypothesis. The interaction effect was compared to the single effects of feedback and goal by considering the model:

$$Y = b_o + b_1x_1 + b_2x_2 + b_3x_1x_2 + \text{error}$$

where Y = performance

x_1 = feedback

x_2 = goal

x_1x_2 = the interaction term of (feedback x goal)

The following results were found using step-wise regression:

Step	Variable Entered	R	R^2	R^2 Change
Step 1	x_1x_2	.40	.16	.16*
Step 2	x_1	.44	.19	.03*
Step 3	x_2	.47	.22	.02

*$p < .05$

The final B's were: $1.7x_1x_2$, $-1.3x_1$, $-.6x_2$. Results supported the third hypothesis that the interaction effect of feedback x goal is the best single predictor of performance.

Discussion

The focus of the present study was on KS as a necessary condition (though not sufficient) for goal or intention to affect task performance. Locke and his colleagues indicated that knowledge is not a sufficient condition for goal setting and task motivation. The crucial issue for them "is not that a person is given KS but what he does with it" (Locke, Cartledge & Koeppel, 1968, p. 475). However, they did not directly test the hypothesis that KS is a necessary condition for goals to affect performance.

The present study tested the hypothesis that KS has a significant effect on goal setting and that it is a necessary condition for goals to affect performance. When feedback is manipulated and goals are set by the individual without any constraints, these hypotheses are congruent with the variant of the B = f (P,E) inter-

action type, proposed by Schneider (1975).

The effect of KS on goal setting was then measured by the extent to which it facilitates the display of individual differences in self-set goals. This was revealed by showing that the variance of self-set goals in the KS group was significantly higher than in the NoKS group. It was under the KS condition, also, that self-set goals were hypothesized to be more strongly related to performance. Results confirmed the hypothesis by revealing a high correlation ($\underline{r}$ = .60; $p < .01$) between self-goals and performance in the KS group which was significantly different from the correlation between the same variables in the NoKS group ($\underline{r}$ = -.01; $p < .05$).

Thus, KS was found to be a necessary condition for goals to affect performance. It was then hypothesized that the interaction term, feedback x goal, which is another way of expressing the above relationship, is the best predictor of performance. Results indicated that the interaction term was the best single predictor of performance (Step 1 in the step-wise regression; R^2 = .16) as compared to the additional single effect of feedback (Step 2; R^2 change = .03) and goal (Step 3; R^2 change = .02). The interaction effect of feedback x goal on performance indicates that both feedback and goals are necessary for the prediction of performance, to which they are interactively related.

These findings also supported the hypothesis raised by Schneider (1975), that performance is more predictable from personal attributes under conditions promoting the display of individual differ-

ences. It should be emphasized that the congruence between the feedback x goal interaction and the person x environment interaction is confined to the following condition: feedback is manipulated by the environment and goals are self-set without any constraints. Thus, they are conceptualized as an environmental attribute and an individual differences characteristic respectively.

The interaction effect of feedback x goal on performance is then the end of the circle which started with the idea of creating situational conditions which facilitate the display of individual differences.

Feedback was found to be such a situational attribute. It facilitates the display of individual differences in self-set goals on the basis of knowledge of individual past performance. Then when self-goals are set, it provides knowledge for future performance to be consistent with the self-set goals. Thus, feedback is a necessary condition for the goal-setting-performance relationship.

The assumption of person x environment interaction means that people with different characteristics attain their maximum performance under particular organizational conditions. Hence, if the organization is interested in predicting behavior, it would be best predicted under a climate which enhances the display of individual differences.

The knowledge that intentions under the feedback condition is a successful predictor of performance does not explain the process

behind its effectiveness. "Information is needed as to how various individual difference factors affect the entire goal setting process" (Steers, 1975). Few studies have ever been accomplished on the effect of such personal traits as need for achievement or self-esteem on performance under different organizational conditions. The even more complex issues, examining the relationship between personality and intentions and trying to understand the relationships between personality traits and intentions under different organizational conditions, and their interactions, have not received attention.

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